WHAT IS CLAIMED IS:

1. A digital subscriber line communicating system for communicating modulated symbols between a transmitting side and a receiving side through a communication line, comprising:

a bitmap calculating unit, provided in said receiving side, for calculating a bitmap which defines the number of transmissible bits for each carrier signal of said symbols in each of periodical noise durations, the calculated bitmap being sent to and stored in said transmitting side during an initialization period of the communication; and

a rate converter, provided in said transmitting side, for converting a constant rate of an input transmitting data into a rate determined by said bitmap, and for adding, in a predetermined number of said periodical noise durations, dummy bits to the data having the converted rate, said dummy bits corresponding to the difference between said rate determined by said bitmap and said constant rate;

said bitmap calculating unit including:

a line quality measuring unit for measuring the quality of said communication line in each of said periodical noise durations;

a transmission bit number converter for calculating the number of transmissible bits to be allocated to each carrier to form said bitmap; and

a bitmap optimizing unit for minimizing said dummy bits by decreasing the number of said transmissible bits allocated to each carrier signal of said symbols.

2. The subscriber line communicating system according to claim 1, wherein, said decreasing is performed in the order from the number of bits allocated to a carrier with a smaller S/N margin to the number of bits allocated to a carrier with a larger S/N margin.

3. The subscriber line communicating system

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according to claim 1, wherein, after said initialization period, said transmitting side transmits data according to said bitmap optimized in said receiving side and transmitted from said receiving side to said transmitting side.

4. The subscriber line communicating system according to claim 1, further comprising:

a timing signal generating unit for generating said timing signal synchronized with a periodical noise including said periodical noise durations which interfere with said transmitting side and said receiving side; and

a sliding window generating unit for generating sliding windows based on said timing signal;

wherein 345 continuous modulated symbols including 5 synchronization symbols constitute a hyperframe including 34 of said sliding windows; and wherein

according to a single bitmap mode in which said symbols are transmitted and received through only insides of said sliding windows, the number of said dummy bits is expressed as:

(a transmitting capacity of data output from said rate converter)-(a transmitting capacity of data input to said rate converter)

= (N_bitmap_inside)*(N_inside)-(N_rate)*(340*8)

where "N_bitmap_inside" is the number of bits transmitted per each symbol in each inside of said sliding windows;

"N_inside" is the number of symbols in the insides of the sliding windows per each hyperframe;

"N_rate" is (N_rate*32kbps) = user data rate;

340*8 is the number of bits in each hyperframe per 32kbps

wherein said dummy bits are minimized by replacing

N_rate = int{(Mi*N_inside)/(340*8)} and
N_bitmap_inside = int[{(N_rate*340*8)+N_inside-1}/N_inside]

where "int" means to round down to an integer; and

"Mi" is number of the transmittable bits per each inside symbol calculated by line quality measuring.

5. The subscriber line communicating system according to claim 1, further comprising:

a timing signal generating unit for generating said timing signal synchronized with a periodical noise including said periodical noise durations which interfere with said transmitting side and said receiving side; and

a sliding window generating unit for generating sliding windows based on said timing signal;

wherein 345 continuous modulated symbols including 5 synchronization symbols constitute a hyperframe including 34 of said sliding windows; and wherein

according to a dual bitmap mode in which said symbols are transmitted and received through both insides and outsides of said sliding windows, the number of said dummy bits is expressed as:

(a transmitting capacity of data output from said rate converter)-(a transmitting capacity of data input to said rate converter)

= (N_bitmap_inside)*(N_inside)+(N_bitmap_outside)*(N_outside)-(N_rate)*(340*8)

where "N_bitmap_inside" is the number of bits transmitted per each symbol in each inside of said sliding windows;

"N_inside" is the number of symbols in the insides of the sliding windows per each hyperframe;

"N_bitmap_outside" is the number of bits transmitted per each symbol in each outside of said

sliding windows;

"N_outside" is the number of symbols in the outsides of said sliding windows per each hyperframe;

"N_rate" is (N_rate*32kbps) = user data rate;

340*8 is the number of bits in each hyperframe per 32kbps

wherein said dummy bits are minimized by replacing

N_rate = int{(Mi*N_inside+Mo*N_outside)/(340*8)} and

N_bitmap_outside = Mo

N_bitmap_inside = int[{(N_rate*340*8)-N_bitmap_outside*N_outside+N_inside-1}/N_inside]

where "int" means to round down to an integer;

"Mi" is number of the transmittable bits per each inside symbol calculated by line quality measuring; and

"Mo" is number of the transmittable bits per each outside symbol calculated by line quality measuring.

6. A transceiver for communicating modulated symbols through a communication line, said transceiver comprising:

a bitmap calculating unit for calculating a bitmap which defines the number of transmissible bits for each carrier signal of said symbols in each of periodical noise durations, the calculated bitmap being sent to and stored in said transmitting side during an initialization period of the communication; and

a rate converter for converting a constant rate of an input transmitting data into a rate determined by said bitmap, and for adding, in a predetermined number of said periodical noise durations, dummy bits to the data having the converted rate, said dummy bits corresponding to the difference between said rate determined by said bitmap and said constant rate;

said bitmap calculating unit including:

a line quality measuring unit for measuring the quality of said communication line in each of periodical noise durations;

a transmission bit number converter for calculating the number of transmissible bits to be allocated to each carrier to form said bitmap; and

a bitmap optimizing unit for minimizing said dummy bits by decreasing the number of said transmissible bits allocated to each carrier signal of said symbols.

7. The transceiver according to claim 6, wherein, said decreasing is performed in the order from the number of bits allocated to a carrier with a smaller S/N margin to the number of bits allocated to a carrier with a larger S/N margin.

8. The transceiver according to claim 6, wherein, after said initialization period, said transmitting side transmits data according to said bitmap optimized in said receiving side and transmitted from said receiving side to said transmitting side.

9. The transceiver according to claim 6, further comprising:

a timing signal generating unit for generating said timing signal synchronized with a periodical noise including said periodical noise durations which interfere with said transmitting side and said receiving side; and

a sliding window generating unit for generating sliding windows based on said timing signal;

wherein 345 continuous modulated symbols including 5 synchronization symbols constitute a hyperframe including 34 of said sliding windows; and wherein

according to a single bitmap mode in which said symbols are transmitted and received through only insides of said sliding windows, the number of said dummy bits is expressed as:

(a transmitting capacity of data output from said rate converter)-(a transmitting capacity of data input to said rate converter)

= (N_bitmap_inside)*(N_inside)-(N_rate)*(340*8)

where "N_bitmap inside" is the number of bits transmitted per each symbol in each inside of said sliding windows;

"N_inside" is the number of symbols in the insides of the sliding windows per each hyperframe;

"N_rate" is (N_rate*32kbps) = user data rate;

340*8 is the number of bits in each hyperframe per 32 kbps

wherein said dummy bits are minimized by replacing

N_rate = int{(Mi*N_inside)/(340*8)} and

N_bitmap_inside = int[{(N_rate*340*8)+N_inside-1}/N_inside]

where "int" means to round down to an integer; and

"Mi" is number of the transmittable bits per each inside symbol calculated by line quality measuring.

10. The transceiver according to claim 6, further comprising:

a timing signal generating unit for generating said timing signal synchronized with a periodical noise including said periodical noise durations which interfere with said transmitting side and said receiving side; and

a sliding window generating unit for generating sliding windows based on said timing signal;

wherein 345 continuous modulated symbols including 5 synchronization symbols constitute a hyperframe including 34 of said sliding windows; and wherein

according to a dual bitmap mode in which said symbols are transmitted and received through both

insides and outsides of said said sliding windows, the number of said dummy bits is expressed as:

(a transmitting capacity of data output from said rate converter)-(a transmitting capacity of data input to said rate converter)

= (N_bitmap-inside)*(N_inside)+(N_bitmap outside)*(N_outside)-(N_rate)*(340*8)

where "N_bitmap_inside" is the number of bits transmitted per each symbol in each inside of said sliding windows;

"N_inside" is the number of symbols in the insides of the sliding windows per each hyperframe;

"N_bitmap_outside" is the number of bits transmitted per each symbol in each outside of said sliding windows;

"N_outside" is the number of symbols in the outsides of said sliding windows per each hyperframe;

"N_rate" is (N_rate*32 kbps) = user data rate;

340*8 is the number of bits in each hyperframe per 32 kbps

wherein said dummy bits are minimized by replacing

N_rate = int{(Mi*N_inside+Mo*N_outside)/(340*8)} and

N_bitmap_outside = Mo

N_bitmap_inside = int[{(N_rate*340*8)-N_bitmap_outside*N_outside+N_inside-1}/N_inside]

where "int" means to round down to an integer;

"Mi" is number of the transmittable bits per each inside symbol calculated by line quality measuring; and

"Mo" is number of the transmittable bits per each outside symbol calculated by line quality measuring.